

EMC Test Report for RM-68



T183 (EN ISO/IEC 17025)

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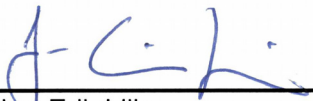
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1 CUSTOMER INFORMATION

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FCC registration number IC file number:	94436 (June 14, 2002) IC 3608 (March 5, 2003)
Client:	Nokia Corporation Joensuunkatu 7 FIN-24100 SALO BOX 86 FIN-24101 SALO Salo Tel. +358-71-8008000 Fax. +358-71-8044277
Contact person:	Ulla Valjakka
Receipt of EUT:	25.11.2004
Date of testing:	16-17.12.2004
Date of report:	21.12.2004

The tests listed in this report have been done to demonstrate compliance with the applicable requirements in FCC rules Part 15 and IC standard ICES-003.

Contents approved:


Jan-Erik Lilja Senior Test Engineer

2 EUT AND ACCESSORY INFORMATION

2.1 EUT description

The EUT is a triple band (GSM850/1800/1900 EGPRS) mobile phone

The highest internal frequency of the EUT is 3979.6 MHz

2.2 EUT and accessories

The table below lists all EUTs and accessories used in the tests. Later in this test report, only numbers in the last column are used to refer to the devices in each test.

	Name	Type	S/N	Number
EUT	Mobile phone	RM-68	004400561600675	40133
Accessories	Battery	BL-5C	-	40128
	Charger	ACP-12	-	40121

Note! Phone HW ID is 2140

SUMMARY OF TEST RESULTS

Section in CFR 47	Section in ICES-003		Result
15.107,a	5.3	AC powerline conducted emissions	PASS
15.109,a	5.5	Radiated emissions	PASS

3 STANDARDS AND MEASUREMENT METHODS

The tests were performed in guidance of CFR 47 Part 15 Subpart B, ANSI C63.4 (2001), ICES-003 and CISPR 22. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method".

4 TEST RESULTS

4.1 AC powerline conducted emissions

EUT	40133
Accessories	40121, 40128
Temp, Humidity, Air Pressure	21°C 49% RH 983 mbar
Date of measurement	17.12.2004
FCC rule part	§15.107
ICES-003 section	5.3
Measured by	Jan-Erik Lilja
Result	PASS

4.1.1 Limit

CISPR 22 Class B limit

Frequency band (MHz)	Quasi-peak limit (dBμV)	Average limit (dBμV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5	56	46
5 – 30	60	50

4.1.2 EUT operation mode

EUT operation mode	Bluetooth idle mode
EUT operation voltage	115V/60Hz

4.1.3 EUT test setup

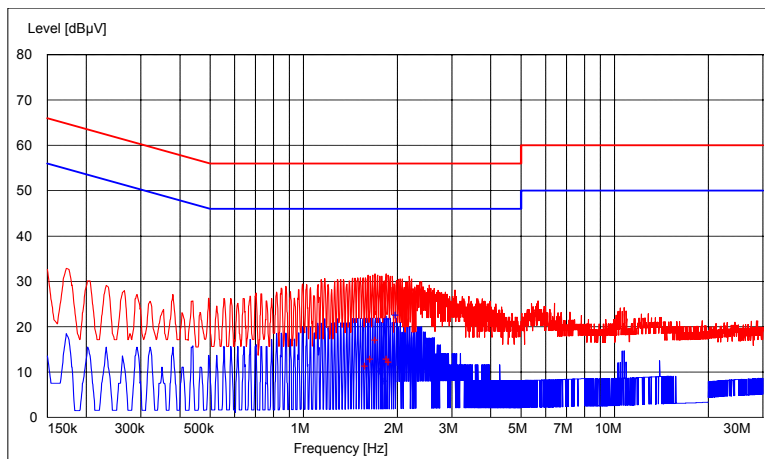


Picture 1 EUT test setup, flip closed



Picture 2 EUT test setup, flip open

4.1.4 Emission measurement data



Picture 3 Emission measurement data

Table 1 Emission measurement data, average detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
1.770000	10.20	10.40	46.00	35.80	AV	L1
1.801500	12.90	10.40	46.00	33.10	AV	L1
1.828500	8.00	10.40	46.00	38.00	AV	L1
1.864500	21.50	10.40	46.00	24.50	AV	L1
1.986000	22.50	10.40	46.00	23.50	AV	L1

Table 2 Emission measurement data, quasi peak detector

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line
1.581000	11.30	10.40	56.00	44.70	QP	L1
1.644000	12.80	10.40	56.00	43.20	QP	N
1.707000	17.10	10.40	56.00	38.90	QP	N
1.855500	12.80	10.40	56.00	43.20	QP	N
1.887000	12.10	10.40	56.00	43.90	QP	N

4.2 Radiated emissions

EUT	40133		
Accessories	40121, 40128		
Temp, Humidity, Air Pressure	21°C	47%RH	997 mbar
Date of measurement	16.12.2004		
FCC rule part	§15.109		
ICES-003 section	5.5		
Measured by	Jan-Erik Lilja		
Result	PASS		

4.2.1 Test method and level, 30 MHz – 8000 MHz

The test was made according to ANSI C63.4 (2001) with following exceptions and additions:

- 1) The measurement was made in semi-anechoic chamber at measurement distance of 3m. The chamber had ferrite and absorber lining in all walls and ceiling, the floor was metal covered.
- 2) The measurement was divided in two parts; prescan and final measurement.

4.2.1.1 Prescan

- a) The EUT was set on the turntable and measuring antenna in horizontal polarization at 1m.
- b) The turntable was set to 0 degrees.
- c) The receiver was set to record the maximum level using peak detector.
- d) The antenna was raised from 1m to 4m in 1 meter steps.
- e) For each antenna height the table was rotated full turn in 30 degree steps.
- f) Antenna polarization was changed to vertical and phases b - e repeated.
- g) All suspect frequencies were recorded in a file.
- h) At every suspect frequency the turntable was rotated around, antenna scanned and the polarization changed to find the maximum levels.

4.2.1.2 Final measurement

- a) The final measurement was run at suspect frequencies only using peak, quasipeak and average detector.
- b) The turntable was rotated full turn to find out the worst azimuth.
- c) On those azimuths obtained in b, the antenna was scanned from 1m to 4m to find out the worst elevation.
- d) Phases b and c were repeated with another antenna polarization.
- e) Obtained values were reported

CISPR 22 Class B limit (3m measuring distance)

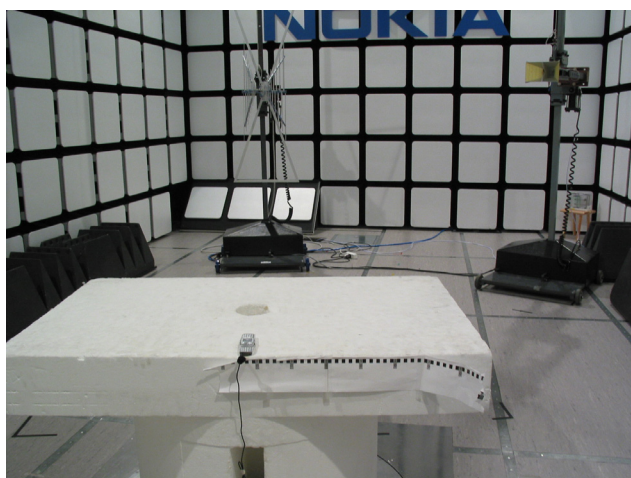
Frequency band (MHz)	Quasi-peak limit (dB μ V/m)
30 – 230	40
230 – 1000	47

Class B limit (3m measuring distance)

Frequency band (MHz)	Limit (µV/m)	Limit (dBµV/m)	Detector
1000-8000	500 / 5000	54 / 74	AV / PK

4.2.2 EUT operation mode

EUT operation mode	Bluetooth idle mode
EUT operation voltage	115V/60Hz

4.2.3 EUT test setup**Picture 4 EUT test setup, flip open****Picture 5 EUT test setup, flip closed****4.2.4 Emission measurement data, 30 MHz – 8000 MHz**

The measurement results were obtained as described below.

$$E[uV / m] = U_{RX} + A_{CABLE} + AF - G_{PREAMP}$$

Where

U_{RX} receiver reading

A_{CABLE} Attenuation of the cable

AF Antenna factor

G_{PREAMP} Gain of the preamplifier

Table 3 Highest emission below 1 GHz QuasiPeak detector

Frequency / MHz	Level / dBµV/m	Transducer	Azimuth / deg	Polarisation	Result
44.590782	7.10	-33.50	124.00	VERTICAL	PASS
55.569539	8.40	-40.80	0	VERTICAL	PASS
125.230461	14.00	-35.60	231.00	VERTICAL	PASS

Table 4 Highest emission above 1 GHz, Peak detector

Frequency / MHz	Level / dBµV/m	Transducer	Azimuth / deg	Polarisation	Result
3525.544088	37.50	-5.70	248.00	HORIZONTAL	PASS
3921.339679	38.80	-2.90	66.00	HORIZONTAL	PASS

Table 5 Highest emission above 1 GHz, Average detector

Frequency / MHz	Level / dBµV/m	Transducer	Azimuth / deg	Polarisation	Result
1947.895792	49.20	-13.70	234.00	VERTICAL	PASS
3520.544088	24.60	-5.70	286.00	HORIZONTAL	PASS
3923.839679	25.80	-2.90	52.00	HORIZONTAL	PASS
7791.083166	33.30	3.10	221.00	VERTICAL	PASS